

Starting Screen & Menus

The first screen of the interface provides some guidance on the PAT workflow.

Start by creating a new project under the "File" menu or opening an existing project.

Move through the four tabs on the left to

- Organize your measures
- Create design alternatives
- Run simulations
- View results

The screenshot shows the main interface of ParametricAnalysisTool. The window title is "ParametricAnalysisTool" and the menu bar includes "File", "Preferences", "Measures", "Cloud", and "Help". The main content area is titled "Getting Started" and contains four sections:

- Under File Menu Choose New Project or Open Project to Get Started**
- Organize and Edit Measures for Project**: Select the baseline model and measures you will use in this project. Measures can come from the local Building Component Library (BCL) or the Online BCL, or you can create your own, available in My Measures.
- Note: After completing this first tab, coming back to this tab and making changes may result in deletion or other changes to your design alternatives.**
- Select Measures and Create Design Alternatives**: Create a series of design alternatives that you want to run. A design alternative is the baseline model with one or more measures applied. Design alternatives allow you to perform "what-if" analyses with different combinations of measures.
- Note: After completing the second tab, coming back to this tab and making changes will result in the deletion of simulation results.**
- Run Simulations**: Once you've set up your design alternatives, you're ready to run the simulations. The run button will kick off each design alternative simulation process. After the simulations finish, you can dig down into the info messages, warning messages, and error messages from each design alternative.
- Create and View Reports**: Compare results from Design Alternatives. Currently standard and calibration reports are available. More reports are being developed.

Below the main interface, several menu overlays are shown:

- File Menu**: About ParametricAnalysisTool, Preferences... (⌘,), Services, Hide ParametricAnalysisTool (⌘H), Hide Others (⌘⇧H), Show All, Quit ParametricAnalysisTool (⌘Q).
- File Menu (continued)**: New Project (⌘N), Open Project (⌘O), Save Project (⌘S), Save Project As, Clear All Results, Export XML Report, Export Analysis Spreadsheet.
- Preferences Menu**: Change My Measures Directory, Scan for Tools, Show Tools.
- Cloud Menu**: Cloud Settings, Monitor Use.
- Measures Menu**: Find Measures.
- Help Menu**: Search (input field), PAT Help.

Organize & Edit Measures for Project 1

Download measures from The [Building Component Library \(BCL\)](#). Drag measures from the library to the central panel.

There are three types of measures:

- **OpenStudio Measures** are run on the OSM model before it is converted to an IDF.
- **EnergyPlus Measures** can be run on the IDF file before it is handed to EnergyPlus.
- **Reporting measures** produce reports to chart results, provide quality assurance, and quality control on models.

"Measure Groups" usually contain one type of measure with different parameters, because only one measure from a measure group can be applied to each design alternative.

"Always Run Measures" will be applied to all design alternatives created from the baseline model.

Check out the [Measure Writing Guide](#) on the [OpenStudio Website](#) and start writing your own custom measures.

Choose your baseline OSM model.

Organize and Edit Measures for Project

Select Your Baseline Model *.osm Browse

OpenStudio Measures

- + New Measure Group (One measure from this group can be applied to each design alternative)
- Drop Measure From Library to Create a New Measure Group
- + New Always Run Measure (This measure is applied to the baseline and all design alternatives)
- Drop Measure From Library to Create a New Always Run Measure

EnergyPlus Measures

- + New Measure Group (One measure from this group can be applied to each design alternative)
- Drop Measure From Library to Create a New Measure Group
- + New Always Run Measure (This measure is applied to the baseline and all design alternatives)
- Drop Measure From Library to Create a New Always Run Measure

Reporting Measures

- + New Always Run Measure
- Drop Measure From Library to Create a New Always Run Measure

Measure Library Edit

Measures

- Envelope 6
- Electric Lighting 1
- Equipment
- People
- HVAC 6
- Refrigeration
- Service Water Heating
- Onsite Power Generation 1
- Whole Building 2
- Economics
- Reporting 4

Onsite Power Generation 1

Whole Building 2

Economics

Reporting 4

QAQC 4

BCL Add Output Variable

BCL Add Output Diagnostics

BCL Standard Reports

BCL Xcel EDA Reporting an

Troubleshooting

Icon indicates type of measure

Duplicates the selected measure and allows you to edit the measure to create your own measure.

Create a new measure from a starting template.

Folder for your own measures. Duplicated measures and your new measures are saved in this folder.

Sync Project Measures with Library

Find Measures on BCL

Updates any of the measures in your project with the latest versions in the library

Opens interface to find and download measures from BCL

Organize & Edit Measures for Project 2

By selecting the measure and selecting the right "Edit" tab, inputs for the measure can be entered and adjusted.

Select a measure and edit parameters in the panel to the right

Always Run Measures are not part of groups

Move measure groups up or down the workflow

x2 to Duplicate a measure or X to delete a measure from the group

Sync Project Measures with Library

Updates any of the measures in your project with the latest versions in the library

Edit allows you to define the selected measure parameters.

Refine the description and name to identify the parameters of this particular version of the measure.

Edit the parameters for this version of the measure here.

Organize & Edit Measures for Project 4: Warnings

A red warning triangle will show up beside your measure if required fields are not complete. Select the measure and complete the fields in the "Edit" panel on the right.

The screenshot shows the ParametricAnalysisTool (PAT) interface. The main window is titled "Organize and Edit Measures for Project" and displays a list of measures under "OpenStudio Measures" and "EnergyPlus Measures". A red warning triangle is visible next to the "Add Cost per Area to Construction Alternative" measure. A yellow callout box points to the warning triangle with the text "Indicates a required field in the measure is empty." The "Edit" panel on the right contains various input fields and checkboxes, with red text indicating required fields. The "Edit" panel includes a "Measure Library" tab and an "Edit" tab. The "Edit" tab contains a text area with instructions, an "Inputs" section with a dropdown menu, and several input fields with labels and values.

Indicates a required field in the measure is empty.

Red text indicates the required field that needs to be completed

ParametricAnalysisTool (PAT) Version 1.4.0

August, 2014

OpenStudio.nrel.gov
Online Training Videos

Organize & Edit Measures for Project 3: BCL

From the "Measures" menu and "Find Measures" along the top or the "Find Measures on BCL" button at the bottom of the "Library" you can access the BCL.

Search for specific measures or browse through the categories.

The "Check All" button can be used to select all the measures on a page view. If you already have a measure in your library the check box will be grayed out and checked.

Search for measures or browse categories

Open menu to Find Measures on BCL

Pages of measures

Checks all measures, on that page for download

Select a measure and the attributes for that measure show up in the right panel.

Measures you already have downloaded are shown with a gray check box.

Measures with boxes that are checked will be downloaded.

Opens the interface shown above and to the left.

Attributes

Requires EnergyPlus Results	false
Uses SketchUp API	false
Measure Function	Measure
Measure Type	ModelMeasure

Files

- EnvelopeAndLoadTestModel_01.osm
- ReverseTranslatedModel.osm
- SetWindowToWallRatioByFacade_Test.rb
- measure.rb
- EnvelopeAndLoadTestModel_02_RotatedSpaceAndEtest.osm

Sources

Tags

Envelope.Fenestration

Measure Library Edit

Measures

- Envelope 6
- Electric Lighting 1
- Equipment
- People
- HVAC 6
- Refrigeration
- Service Water Heating
- Onsite Power Generation 1
- Whole Building 2
- Economics
- Reporting 4

Organize & Edit Measures for Project 5: New Measure

Hit the "New Measure" icon to open a dialog to create your own measure. Write a descriptive title, more detailed descriptions, and select the measure type and taxonomy.

Duplicating a measure opens up a similar dialog, but the name of the measure will have "copy" added at the end.

The *Measure Writing Guide* on the OpenStudio website will guide you through this process and provide best practices.

The screenshot shows the ParametricAnalysisTool interface with the 'New Measure' dialog box open. The dialog box contains the following fields:

- Name:** New Measure
- Class Name:** NewMeasure
- Description:** Replace this text with an explanation of what the measure does in terms that can be understood by a general building professional audience (building owners, architects, engineers, contractors, etc.). This description will be used to create reports aimed at convincing the owner and/or design team to implement the measure in the actual building design. For this reason, the description may include details about how the measure would be implemented, along with explanations of qualitative benefits associated with the measure. It is good practice to include citations in the measure if the description is taken from a known source or if specific benefits are listed.
- Modeler Description:** Replace this text with an explanation for the energy modeler specifically. It should explain how the measure is modeled, including any requirements about how the baseline model must be set up, major assumptions, citations of references to applicable modeling resources, etc. The energy modeler should be able to read this description and understand what changes the measure is making to the model and why these changes are being made. Because the Modeler Description is written for an expert audience, using common abbreviations for brevity is good practice.
- Measure Type:** OpenStudio Measure
- Taxonomy:** Envelope, Form

Buttons at the bottom of the dialog include 'Create Measure and Open for Editing' and 'Cancel'. A yellow callout box points to the 'Create Measure and Open for Editing' button with the text: 'Opens the new measure folder so you can edit the measure in a text editor.'

Below the dialog box, a file explorer window titled 'NewMeasure 2' is open, showing a folder structure with files 'measure.rb', 'measure.xml', and a subfolder 'tests'. A callout box points to the 'my' folder in the background interface with the text: 'Folder for your own measures. Duplicated and your new measures are saved in this folder.'

At the bottom of the interface, there are two buttons: 'Sync Project Measures with Library' and 'Find Measures on BCL'. Callout boxes provide additional information:

- 'Sync Project Measures with Library': Duplicates the selected measure and allows you to edit it to create your own measure
- 'Find Measures on BCL': Creates a new measure from a starting template

The *Modeler Description* is meant to assist the energy modeler. It should:

- explain in some detail how the measure manipulates the model and where appropriate what model objects are being added or altered.
- offer any special guidance that the measure writer wants to communicate to people using the measure

Select Measures & Create Design Alternatives 1

This tab allows you to create design alternatives from the measures you put into your project on the first tab.

The left panel provides a list of available OpenStudio measure groups and measures.

A maximum of one measure from a group can be applied to a single design alternative. But you can apply measures from different groups on a single model.

Select the measures you want to apply by clicking on the measure name. Depending on what measures you select the buttons on the right top panel will create the alternative.

You can create one design alternative for each measure selected with the "Create One For Each Selected Measure."

To create one design alternative with many measures applied, select the measures and hit "Create One With Selected Measures."

If you want to bring in an external model to compare as an alternative use the "Create From External File" button.

Buttons available depending on what measures you have selected in the left panel

Buttons available depending on what measures you have selected in the left panel

- Selects all measures in project
- Clears all measure selections
- Creates a single design alternative for each selected measure
- Creates one design with all the selected measures, a maximum of one measure per measure group.
- Creates a design alternative from an external file

ParametricAnalysisTool File Preferences Measures Cloud Help
mySchool

Select Measures and Create Design Alternatives

Select Measure(s) from Project Measures
Select All Clear Selection

OpenStudio Measures

Increase R-Value of Insulation for Exterior Walls
R30 Exterior Wall Insulation
R40 Exterior Wall Insulation
R100 Exterior Wall Insulation

Decrease Lighting Power Density in Corridors
0.9 W/sf Corridor Lighting
0.8 W/sf Corridor Lighting
0.5 W/sf Corridor Lighting

Increase Cooling Efficiency for AHU
COP 4 DX Coils
COP 5 DX Coils

Increase R-Value of Insulation for Roofs
R30 Roof Insulation
R45 Roof Insulation

Set Window to Wall Ratio by Facade Group
Set Window to Wall Ratio by Facade Alterr

Create Design Alternatives
Create One For Each Selected Measure Create One With Selected Measures Create From External File

Baseline and Measures Applied to All
Adjust Thermostat Setpoints by Degrees

Measure Group

Select multiple measures by clicking on the measure name

Select Measures and Create Design Alternatives

Select Measure(s) from Project Measures
Select All Clear Selection

OpenStudio Measures

Increase R-Value of Insulation for Exterior Walls
R30 Exterior Wall Insulation
R40 Exterior Wall Insulation
R100 Exterior Wall Insulation

Decrease Lighting Power Density in Corridors
0.9 W/sf Corridor Lighting
0.8 W/sf Corridor Lighting
0.5 W/sf Corridor Lighting

Increase Cooling Efficiency for AHU
COP 4 DX Coils

Click measure names to select. The background of selected measures turns orange

Select Measures & Create Design Alternatives 2

The examples to the right show how your measure selections determine what buttons are available for creating design alternatives.

Buttons available depending on what measures you have selected in the left panel

Buttons available depending on what measures you have selected in the left panel

- Selects all measures in project
- Clears all measure selections
- Creates a single design alternative for each selected measure
- Creates one design with all the selected measures, a maximum of one measure per measure group
- Creates a design alternative from an external file

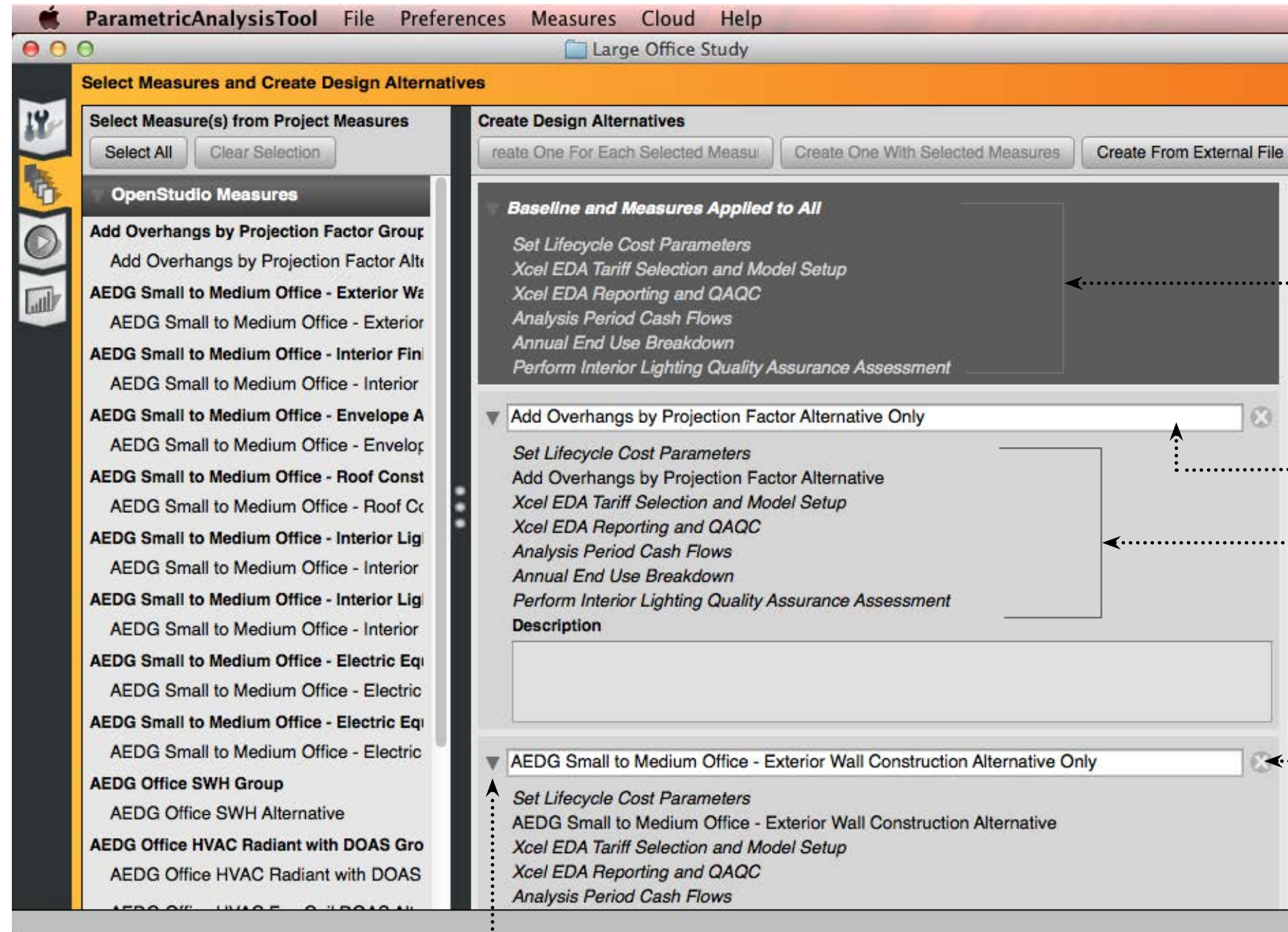
If measures within the same measure group are selected then the *Create One With Selected Measures* button is not available

Select Measures & Create Design Alternatives 1

Once you create design alternatives, they appear in the right panel. The name of the alternative can be edited. The measures applied to each alternative are viewable by expanding the view.

The baseline model always appears at the top of the right panel with a dark gray background. The "Always Run" measures are listed under the baseline and are run on all design alternatives.

Design alternatives can be removed by hitting the delete button.



Measures being applied to the baseline model and all design alternatives

Name of design alternative

Measures being applied to the model. Always run measures are in italic

Delete a design Alternative

Expand or collapse details

Run Simulations Locally

Select the design alternative you want to run. Selected alternatives turn the yellow-orange. Hit the run button to start the simulations.

If you want to run a daylighting analysis with Radiance select that option here.

Runs locally if cloud is off

Starts simulation runs for selected

Progress bar displays summary status of runs. It stays at 0 until a run is finished

Turns on the cloud (takes a few minutes) and you can run selected simulations on the cloud

Select daylighting analysis engine

Clears all results

Clears individual results

Showing that 2 out of 5 simulation runs are finished

Click arrow to open and view run warnings and errors

Run Simulations

Run Locally

Turn On Cloud

Select Daylight Simulation Engine EnergyPlus Radiance

Select All Clear Selection All

Simulation Name	Status	Progress	0 NAs	0 Warnings	0 Errors	Clear
▶ Baseline	Not Started	Not Started	0 NAs	0 Warnings	0 Errors	
▶ R30 Exterior Wall Insulation Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors	
▶ R40 Exterior Wall Insulation Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors	
▶ R100 Exterior Wall Insulation Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors	
▶ 0.9 W/sf Corridor Lighting Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors	
▶ 0.8 W/sf Corridor Lighting Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors	
▶ 0.5 W/sf Corridor Lighting Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors	
▶ COP 4 DX Coils Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors	
▶ COP 5 DX Coils Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors	
▶ R30 Roof Insulation Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors	
▶ R45 Roof Insulation Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors	
▶ Set Window to Wall Ratio by Facade Alternative Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors	

Running Locally 40% Complete Turn On Cloud

Select Daylight Simulation Engine EnergyPlus Radiance

Select All Clear Selection All

Simulation Name	Time	Status	0 NAs	7 Warnings	0 Errors	Clear
▶ Baseline	2014-Aug-05 16:42:00	Finished	0 NAs	7 Warnings	0 Errors	
▶ Set Window to Wall Ratio by Facade Alternative 0.4 Only	2014-Aug-05 16:42:00	Running	1 NA	7 Warnings	0 Errors	
▶ Set Window to Wall Ratio by Facade Alternative 0.3 Only	2014-Aug-05 16:42:00	Finished	1 NA	7 Warnings	0 Errors	
▶ ReduceSpaceInfiltrationByPercentage Alternative 30 Onl	2014-Aug-05 16:42:00	Running	1 NA	2 Warnings	0 Errors	
▶ ReduocoSpaceInfiltrationByPercentage Alternative 35 Onl	2014 Aug 05 16:42:00	Running	1 NA	7 Warnings	0 Errors	

View Locally Run Results

Warnings and errors can be viewed by expanding the baseline or alternative.

The screenshot shows the ParametricAnalysisTool (PAT) interface. The title bar reads "ParametricAnalysisTool" with menu items "File", "Preferences", "Measures", "Cloud", and "Help". The window title is "3StoryCourtyardSchoolPre1980". The main area is titled "Run Simulations" and contains a "Run Locally" button with a play icon and a "Turn On Cloud" button. Below these are radio buttons for "Select Daylight Simulation Engine" with "EnergyPlus" selected and "Radiance" unselected. There are also "Select All" and "Clear Selection" buttons. The simulation results are displayed in a table:

Simulation Name	Time	Status	Warnings	Errors
Baseline	2014-Jul-28 13:15:27	Finished	292 Warning	0 Errors
Adjust Thermostat Setpoints by Degrees	2014-Jul-28 13:15:27	Idle	0 Warnings	0 Errors
ModelToldf	2014-Jul-28 13:15:35	Idle	2 Warnings	0 Errors
ExpandObjects	2014-Jul-28 13:15:51	Idle	0 Warnings	0 Errors
EnergyPlusPreProcess	2014-Jul-28 13:15:54	Idle	0 Warnings	0 Errors
EnergyPlus	2014-Jul-28 13:15:58	Idle	290 Warning	0 Errors
OpenStudioPostProcess	2014-Jul-28 13:18:04	Idle	0 Warnings	0 Errors

The "ModelToldf" row is expanded, showing the following details:

- Initial Condition:** Initial cooling setpoints used in the model range from 75.2 F to 80.06 F. Initial heating setpoints used in the model range from 60.08 F to 69.8 F.
- Final Condition:** Final cooling setpoints used in the model range from 76.2 F to 81.06 F. Final heating setpoints used in the model range from 58.08 F to 67.8 F.

A callout points to the "ModelToldf" row with the text "View warnings and Errors".

Running on the Cloud: Settings 1

Before you click the "Turn on Cloud" button, fill out the *Cloud Settings* dialogs from the *Cloud* menu.

Add information on your Amazon EC2 account and agree to the terms on the first screen.

Currently only Amazon EC2 is available through PAT.

The "Monitor Use" dialog under the *Cloud* menu will show you how many instances you have in your current project as well as other projects. If your "Total Instances Running" is more than 0, and you don't know why, you can go to the EC2 Console website to terminate them. The "Estimated EC2 Charges" value is directly from Amazon, but may be up to 24 hours delayed. As a result you won't see this change on the fly as you are working on a project, you will typically see it the next day.

Learn more about using Amazon cloud at aws.amazon.com.

The screenshot shows the ParametricAnalysisTool interface with the 'Cloud' menu open, highlighting 'Cloud Settings' and 'Monitor Use'. The 'Cloud Settings' dialog is the primary focus, containing the following elements:

- Cloud Resources:** A dropdown menu set to 'Amazon EC2'. An annotation points to it with the text: "Select cloud, only Amazon currently enabled".
- Access Key:** A text input field with a blue highlight. An annotation points to it with the text: "Access Key and Secret Key from your Amazon account".
- Secret Key:** A text input field with masked characters (dots).
- Warning Box:** A red-bordered box with the following text: "PAT cloud support with Amazon EC2 is a new feature, and is still under active development to improve interprocess reliability and performance. The user assumes all responsibility for orphaned EC2 processes, and it is strongly recommended that you monitor EC2 cloud usage at aws.amazon.com to avoid any unwanted charges."
- Terms and Conditions:** A large block of text starting with "OpenStudio is provided by the National Renewable Energy Laboratory (NREL)..." and "THE SOFTWARE IS PROVIDED BY DOE/NREL/ALLIANCE 'AS IS'...". An annotation points to the "I Agree" checkbox with the text: "Agree to terms before continuing".
- Buttons:** 'Continue', 'Save', and 'Cancel' buttons at the bottom.

On the right side, the 'Monitor Use' dialog is also visible, showing:

- Estimated EC2 Charges: N/A
- Project Run Time: 0 minutes
- Instances Running on Current Project: 0
- Total Instances Running: N/A
- A button: "Manage all Projects with AWS Console"
- Warning text: "Stopping the cloud will terminate all instances. Any detailed results not selected for download will be lost."
- An "OK" button.

Running on the Cloud: Settings 2

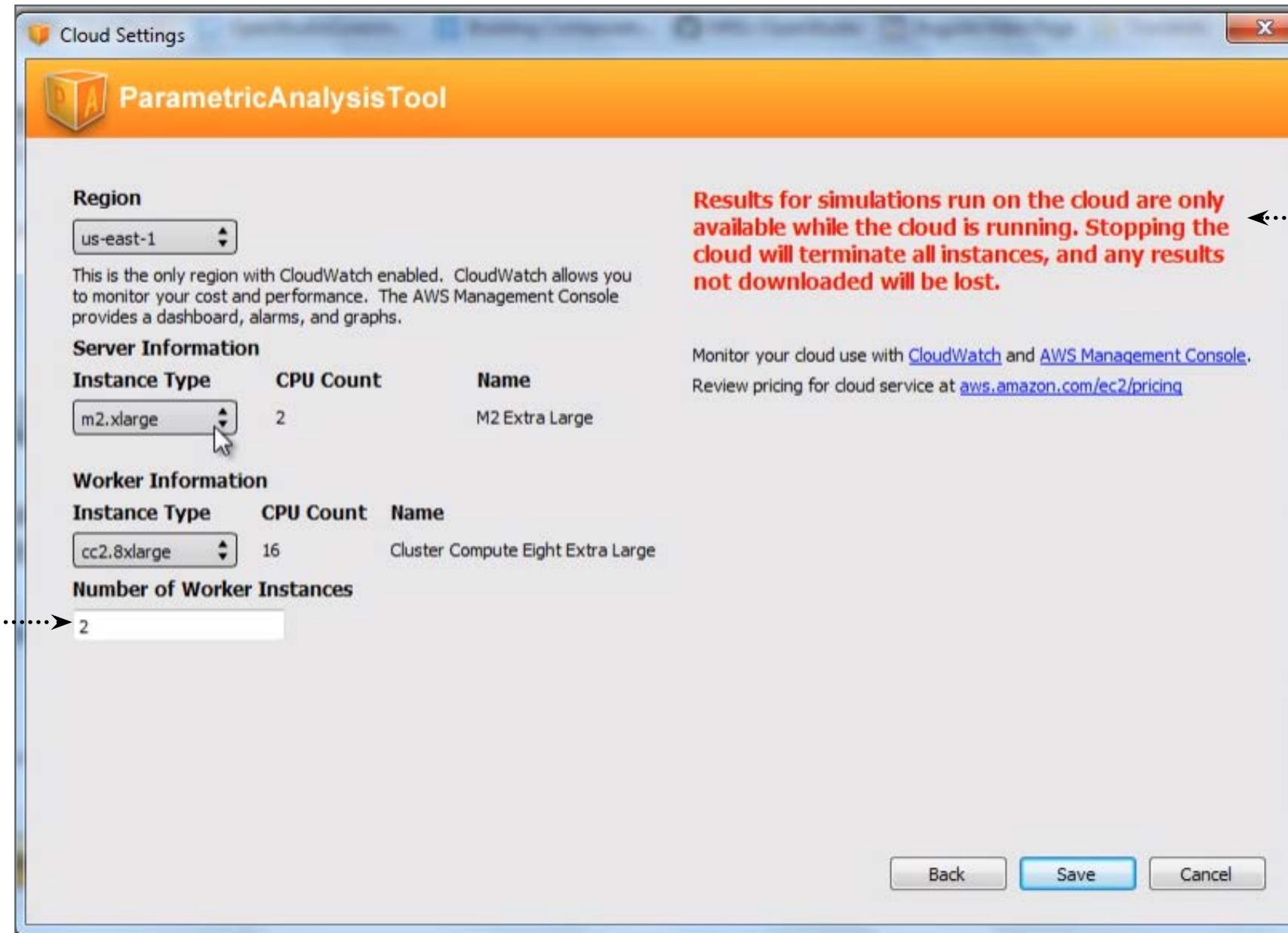
On the second screen of the "Cloud Settings" dialog, confirm that you have chosen the desired server, worker, and number of workers.

As soon as you hit the "Turn on Cloud" button you will start incurring charges, and the smallest increment is one hour. If you have to cancel and re-start it you will be charged again.

Review pricing at <http://aws.amazon.com/ec2/pricing/>



Access the cloud settings for connecting to Amazon



Download the results you need before terminating the cloud connection

Determines how many simulations can be run, but also increases the fees per hour

ParametricAnalysisTool (PAT) Version 1.4.0

August, 2014

OpenStudio.nrel.gov
Online Training Videos

Running Simulations on the Cloud

Select your baseline model, then run locally before you start the cloud to confirm that it is valid and will run properly. To do this you can deselect all other design alternatives, and then select just the baseline.

Before you click the "Run on Cloud" button, make sure you have selected all of the design alternatives that you want to run. Choosing "Select All" will select all jobs that have not already been run locally, or on a previous cloud session.

Quitting PAT while the cloud is on will not close the EC2 instances. If you Launch PAT again but open a different project it may look like the cloud is off, but that is only relevant for that current project.

To properly end the cloud session in PAT re-open the PAT project (if you have closed it) and then click the button to stop the cloud. For a few minutes you will see "Stopping Cloud".

Once you stop the cloud you will no longer be able to download detailed simulation results. If this happens and you want to get one, you can always run that job locally. It is generally not recommended to download detailed results for all design alternatives, as that will use a lot of hard drive space and network bandwidth.

Once the cloud is on, the Run Button is enabled

Turns on the cloud and you can run selected simulations on the cloud

Turning on cloud. This takes a few minutes

Button turns off cloud. Time and number of instances displayed

Stops cloud—takes a few minutes

Cloud connection is lost, go to AWS Cloud Management Console to terminate session

Clears all results

Detailed results downloaded

Detailed results not downloaded

Detailed results to be downloaded

Button disabled while running simulations

Baseline	2014-Aug-07 10:56:30	Finished	0 NAs	16555 Warnings	0 Errors
AEDG K12 - Exterior Wall Construction Alternative Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors
AEDG K12 - Roof Construction Alternative Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors
AEDG K12 - Interior Finishes Alternative Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors
AEDG K12 - Fenestration and Daylighting Controls Alternative Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors
AEDG K12 - Envelope And Entry Infiltration Alternative Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors
AEDG K12 - Exterior Lighting Alternative Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors
AEDG K12 - Interior Lighting Alternative Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors
AEDG K12 - Interior Lighting Controls Alternative Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors
AEDG K12 - Electric Equipment Alternative Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors
AEDG K12 - Electric Equipment Controls Alternative Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors
AEDG K12 HVAC Dual Duct DOAS Alternative Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors
AEDG K12 HVAC Fan Coil DOAS Alternative Only	Not Started	Not Started	0 NAs	0 Warnings	0 Errors

AWS Management Console

It is always a good idea to go to the EC2 website to confirm that the instances have shut down. To view your EC2 web console, click the "Manage all Projects with AWS Console" in the "Monitor Use" dialog or "AWS Management Console" in the "Cloud Settings" dialog. It will take you to this address (<http://aws.amazon.com/console/>). Once there click "Sign in to the AWS Console"

The screenshot shows the AWS Management Console website. At the top right, there is a link "Create an account" with a dotted arrow pointing to a "Sign Up" button. Below the navigation bar, there is a "Sign in to the AWS Console" button with a dotted arrow pointing to it from the right, labeled "Sign in to your account". The main content area features the heading "AWS Management Console" and a sub-heading "Access and manage Amazon Web Services through a simple and intuitive web-based user interface. You can also use the [AWS Console mobile app](#) to quickly view resources on the go." Below this, there are sections for "Features", "Administer your AWS account", and "Manage AWS resources from any device", each with a brief description and a small image. The left sidebar contains "PRODUCTS & SERVICES" (AWS Console, AWS Console Mobile App, FAQs) and "RELATED LINKS" (Documentation, Articles & Tutorials, Developer Tools, Public Data Sets, Amazon Machine Images (AMIs), Videos & Webinars).

AWS Management Console

It is always a good idea to go to the EC2 website to confirm that the instances have shut down. To view your EC2 web console, click the "Manage all Projects with AWS Console" in the "Monitor Use" dialog or "AWS Management Console" in the "Cloud Settings" dialog. It will take you to this address (<http://aws.amazon.com/console/>). Once there click "Sign in to the AWS Console."

The screenshot shows the AWS Management Console interface. At the top, there are browser tabs for "NREL: OpenStudio - Oper...", "OpenStudio - Pivotal Trac...", and "EC2 Management Console". The main content area displays a list of EC2 instances. A callout box titled "Actions" is shown, with a mouse cursor hovering over the "Terminate" option. A dotted arrow points from this callout to the "Actions" dropdown menu in the console. Below the instance list, a detailed view for the instance "OpenStudio-Server V1.1.0" (Instance ID: i-d59abfb1) is shown. The "Public DNS" field is highlighted in blue, and a dotted arrow points from it to a text box at the bottom of the page that says "Copy this address and paste it into the browser to track your run and view results".

Terminate instances here if you need to

Actions
Terminate
Reboot
Stop
Start

EC2 Dashboard
Events
Tags

Launch Instance Connect Actions

Filter: All instances All instance types Search Instances

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS
OpenStudio-Worker V1.1.0	i-11721468	cc2.8xlarge	us-east-1d	running	2/2 check...	None	ec2-54-221-
OpenStudio-Worker V1.1.0	i-1372146a	cc2.8xlarge	us-east-1d	running	2/2 check...	None	ec2-54-205-
OpenStudio-Server V1.1.0	i-d59abfb1	m2.xlarge	us-east-1c	running	2/2 check...	None	ec2-50-17-1-

Instance: i-d59abfb1 (OpenStudio-Server V1.1.0) Public DNS: ec2-50-17-175-23.compute-1.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID i-d59abfb1

Instance state running

Public DNS ec2-50-17-175-23.compute-1.amazonaws.com

Elastic IP -

© 2008 - 2013, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Feedback

Copy this address and paste it into the browser to track your run and view results

OpenStudio Cloud
Management Console

OpenStudio Cloud Management
Console

The screenshot shows the OpenStudio Cloud Management Console interface. The top navigation bar includes Home, Projects, Analyses, Admin, and About. The dashboard displays 1 Project, 1 Analysis, 94% Completed, and 0% Failed. A 'Simple Project Analysis' card shows a pie chart with 1 started and 17 completed items, totaling 18. A 'View Analysis' button is highlighted with a red box and a red arrow pointing to the detailed analysis view.

The detailed analysis view shows a table with the following data:

Name	Project	Type	Status	Start Time (UTC)	End Time (UTC)	Delta Time (s)	View
Simple Project Analysis	37bac106-9f49-427b-8e1f-fd1430a495b0	batch_run	started	00-07-2014 17:15:19			JSON Zip File

Below the table, there are links for 'List of Measures (0)', 'List of Variables (0)', 'View Parallel Coordinates Plot', 'View Scatter Plot', 'View XY Plot', 'Interactive XY Plot', 'Download CSV', 'Download R Data Frame', and 'Debug Log'. A 'Stop Analysis' button is also present.

The 'Simulations (18)' section shows a table of simulation results:

Name	Status	Status Message	Obj Func Total Site Energy (EUI)	Obj Func Total Life Cycle Cost	Start Time (UTC)	End Time (UTC)	Delta Time (s)	View	Action
New Design Alternative 1	started				00-07-2014 17:27:12			HTML JSON	Destroy
Xcel FDA Tariff Selection and Model Setup Alternative Only	completed	completed normal	17107.5	4131610.0	08-07-2014 17:16:07	08-07-2014 17:22:07	360.27	HTML JSON Zip File Bar Chart Radar Plot	Destroy
AEDG K12 - Interior Lighting Alternative Only	completed	completed normal	16045.3	0.0	08-07-2014 17:16:07	08-07-2014 17:23:37	449.66	HTML JSON Zip File Bar Chart Radar Plot	Destroy
AEDG K12 - Electric Equipment Alternative Only	completed	completed normal	16319.9	0.0	08-07-2014 17:16:07	08-07-2014 17:23:38	450.9	HTML JSON Zip File Bar Chart Radar Plot	Destroy

Run Progress

View Analysis

- View and download results in different formats:
- List of Measures
 - List of Variables
 - View Parallel Coordinates Plot
 - View Scatter Plot
 - View XY Plot
 - Interactive XY Plot
 - Download CSV
 - Download R Data Frame
 - Debug Log

View and download individual results in different formats

Results — Standard

While your project is running on the cloud you can choose the design alternative and select "Download Detailed Results for Selected File" if you want more detailed data on some of the options.

Right click on a design alternative to view the EnergyPlus or OpenStudio Results.

This is the Standard View

Calibration View

PAT 0925 1336 Design Alternatives_FinishedCloudRun_75dp — ParametricAnalysisTool

File Preferences Online BCL Cloud Help

Create and View Reports

View: Standard Calibration

Design Alternative Name	Energy Use Intensity (kBtu/ft2-yr)	Peak Electric Demand (kW)	Electricity Consumption (kWh)	Natural Gas Consumption (Million Btu)	District Cooling Consumption (Million Btu)	District Heating Consumption (Million Btu)	First Year Capital Cost (\$)	Annual Utility Cost (\$)	Total LCC (\$)	
Baseline	161	215	807,169	1,269	0	0	2,907,000	69,878	4,262,421	
Design Alternative Name	Energy Use Intensity Reduction (kBtu/ft2-yr)	Peak Electric Demand Reduction (kW)	Electricity Savings (kWh)	Natural Gas Savings (Million Btu)	District Cooling Savings (Million Btu)	District Heating Savings (Million Btu)	First Year Capital Cost Increase (\$)	Annual Utility Cost Savings (\$)	Simple Payback (years)	Total LCC Savings (\$)
Set R-value of Insulation for exterior walls to a Specific Value R-17.5 Only	--	--	--	--	--	--	--	--	--	--
Set R-value of Insulation for Exterior Walls to a Specific Value R-20 Only	--	--	--	--	--	--	27,000 1%	845 1%	32	1,048,861 25%
Set R-value of Insulation for Roofs to a Specific Value R-30 Only	--	--	--	--	--	--	--	--	--	--
Set R-value of Insulation for Roofs to a Specific Value R-40 Only	0 0%	2 1%	2,886 0%	1 0%	0	0	25,000 1%	315 0%	79	973,511 23%
Set R-value of Insulation for Roofs to a Specific Value R-50 Only	--	--	--	--	--	--	--	--	--	--

Download Detailed Results for Selected File

Open File in the OpenStudio Application

dir

Download detailed results of selected file

Opens selected file in OpenStudio application

Opens directory of files for this project. Open individual design alternative file directory.

Baseline results shown with the darker gray background

Select a row to enable the buttons along the bottom

Detailed Reports:
EnergyPlus Results
Results | OpenStudio

Right click on design alternative name to open the reports for this alternative

Results — Calibration

To calibrate to the ASHRAE 14-2002 or FEMP standard the baseline model must contain all utility data for one year and real weather data. Check the guidelines for additional requirements.

By selecting the "Calibration" report you can compare the model and actual utility bills.

The report provides ASHRAE 14-2002 calibration standard and the FEMP calibration standard options.

This is the Standard View

Calibration View

PAT Calibration Screenshot — ParametricAnalysisTool

File Preferences Measures Cloud Help

Create and View Reports

View: Standard Calibration

ASHRAE 14-2002 NBME of 5% or less and CV(RSME) of 15% relative to monthly data. Must contain all utility data for one year and real weather data. Check the guideline for additional requirements.

Design Alternative Name	Electricity Consumption NMBE	Electricity Consumption CVMSE
Baseline	-6.02%	5.88%
Reduce Elec Equip Loads 5%	-0.27%	1.05%
Reduce Elec Equip Loads 7%	2.03%	2.18%
Reduce Elec Equip Loads 9%	4.34%	4.25%
Reduce Elec Equip Loads 11%	6.64%	

Select a row to enable the buttons along the bottom

Opens selected file in OpenStudio application

Opens directory of files for this project

Create and View Reports

View: Standard Calibration

Design Alternative Name

Energy Use Peak Electric Electricity Natural Gas District Cooling District Heating First Year Annual Utility

dataPoint2

FAVORITES

- All My Files
- Applications
- Desktop
- Downloads
- mschott
- Documents
- Pictures
- Google Drive

DEVICES

- Macintosh HD
- Remote Disk

SHARED

TAGS

- Red
- Orange
- Yellow

Open File in the OpenStudio Application

Results — Opening HTML Files from Directory

You can open htm report files in your browser. EnergyPlus and standard and calibration OpenStudio reports can be found by right clicking on a design alternative, on the Results tab, and selecting the results you want to view.

Coefficient of Variation of the Root Mean Squared Error
Normalized Mean Bias Error



Model
Actual

Compare the modeled with actual utility bills